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RESEARCH ARTICLE

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CONTENT BASED IMAGE RETRIEVAL WITH SURF, SVM AND K-MEANS

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ABSTRACT

Medical images are decisive field of knowledge for a positive effect on the body or mind. The growth of these medical images is increasing in recent year due to the advancement of the digital technology. In this paper we have proposed three techniques – SURF, SVM and K-Means to find the accuracy in medical images. This paper shows the better result as compared to the previous method. We have also done comparative analysis on the basis of MSE, PSNR feature point and matching time. Our method shows the better result for all these matrices. For the Content-Based Image Retrieval, our proposed method is more sophisticated and gives better accuracy, less matching time and less feature point as compared to the previous method – SURF and SVM.

INTRODUCTION

A large number of medical images can be stored in the database and the growth of the digital technology increases by applying such technique. It is some difficult area to develop careful systems for the medical image retrieval and annotation based on visual content. Content based image retrieval has some success in the field of medical application. CBIR is the retrieval of images based on visual features - colour, texture and shape. Reasons for its development are necessary to large medical image databases through traditional methods of image indexing have proven to be insufficient, laborious to determined and extremely time consuming for researchers. These old methods are not relevant to used for image indexing which ranging from storing an image in the database and associating it with a keyword or number or other symbols to associating it with a categorized description and obsolete. This is not CBIR (why?). In CBIR, each image that is stored in the database has its features extracted and compared to the features of the query image. At present, the image matching methods can be roughly divided into two classes; one is the image matching based on image matching and feature matching. In parallel with this growth, con-tent based retrieval and querying the indexed collections are required to access visual information.

Related work

In recent research, despite the huge number of description has been given in the published paper. But few reliable solutions have been presented in the medical images by the researchers. Anna Wojnar et al. worked to represent for the medical images annotation based on the SURF descriptor and the SVM classifier. Training and Testing have been done the IRMA radiographic images in database [1]. Wang Chuan-xu et al. presented binocular depth measurement based on Speed-Up-Robust-Feature and Grubbs method to

remove outliers of visual disparities and found the accuracy and robustness [2]. Stevan Rudinac et al. proposed quality of image retrieval and reduce the processing time using feature vector and feature vector reduction [3]. Jingxin Hong et al. taken an image mosaic algorithm for better improvement based on SURF feature matching and applied on different scale and moving objects to calculate their speed [4]. Zianlin Zhang et al. have taken all color edge direction features for the content based image retrieval helpful for uses the edge direction feature as the color feature's weight which belongs to the same color features for each sub-block [5]. Xe Chen et al. worked for matching images captured at particular locations or places of interest by selecting representative images from an image collection using SHIFT [6]. Yi Yang et al. has done to recognize gestures analysis of cartoon images using features including methods - global color histogram, local color histogram, edge feature and motion direction feature for the content-based cartoon image retrieval and interactive cartoon clip synthesis [7]. K. Velmurugan et al. has taken color features using SURF to improve the retrieval accuracy. They worked and found optimal solution by combining KD-tree with the Best Bin First search algorithm for retrieval the match images from database [8]. Young Deok Chun et al. worked on CBIR technique which uses the combination of - and -component color autocorrelograms and H-component BDIP-BVLC moments extracted in the wavelet transform domain [9]. Md Mahmudur Rahman et al. proposed a classification-driven biomedical image retrieval framework based on image filtering and similarity fusion by employing supervised learning techniques through SVM [10].

Proposed Methods

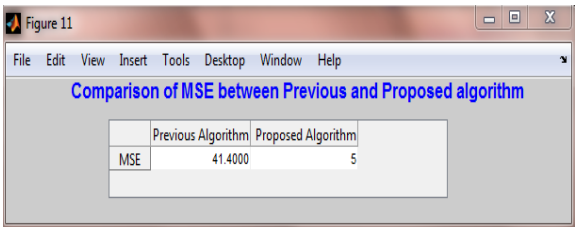
In this paper, we have been used three techniques – SURF, SVM and K-Means for the Content Based Image Retrieval for the accuracy of the medical images. SURF (Speeded up Robust Features) is a robust local feature detector. It has one of the famous feature-detection algorithms using a Hessian matrix-based measure for the detector, and a distribution-based descriptor and by simplifying these methods to the essential. SVM is a classifier for classification of the data. The SVM classifier is widely used in bioinformatics (and other disciplines) due to its highly accurate, able to calculate and process the high-dimensional data such as gene expression, and exibility in modeling diverse sources of data. K-Means is an iterative refinement heuristic algorithm that works faster. K-Means clustering helps in procedures which can be applied for scalable image retrieval from large databases.

Result and Discussion

In this paper the results have been taken for 98 medical images in the database and we have found the result on the basis of MSE, PSNR, Feature Point, Matching time, Accuracy.

MSE: In table 1, we have shown the comparison of the mean square error between the previous method and the proposed method. Our method shows the best result as compared to the previous work as given below:

Table 1 Comparison of MSE



PSNR: In table 2, we have shown the comparison of the peak-signal-to-noise between the previous method and the proposed method for accuracy. Our method shows the best result as compared to the previous work as given below:

Table 2 Comparison of PSNR

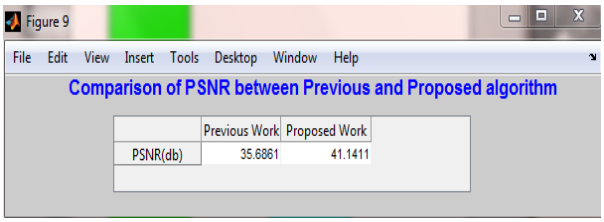


Figure 2, shows the graphical representation of the tabulated form of PSNR as following below:

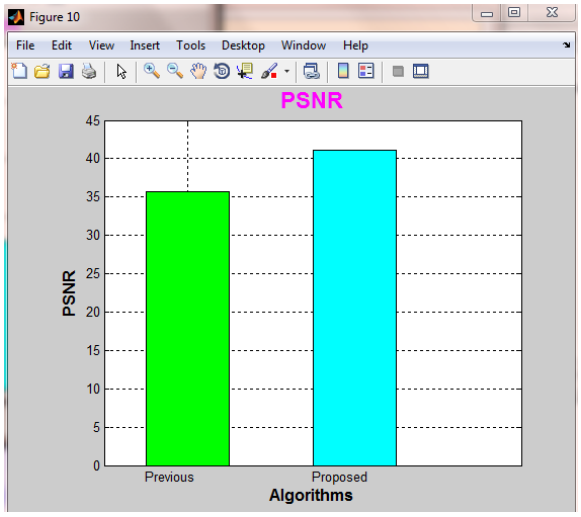


Figure 2 Comparison of PSNR

Feature Point: In table 3, we have shown the comparison of feature point the previous method and the proposed method because our proposed method shows the minimum feature point. Our method shows the best result as compared to the previous work as given below:

Table 3 Comparison of feature point

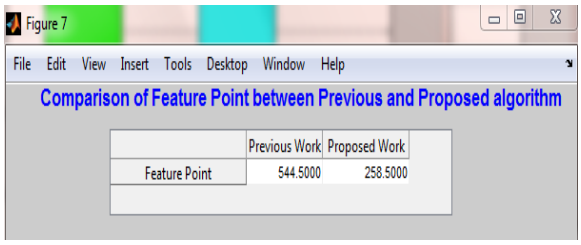


Figure 3, shows the graphical representation of the tabulated form of feature point as given below:

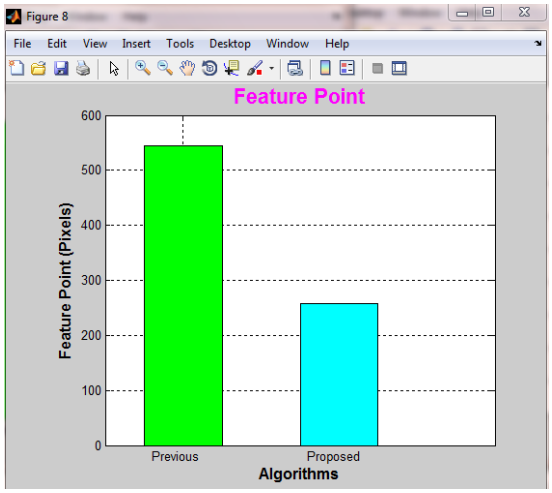


Figure 3 Comparison of feature point

Matching Time: In table 4, we have shown the comparison of matching time between the previous method and the proposed method. Our method shows less matching time result as compare to the previous work as given below:

Table 4 Comparison of matching time

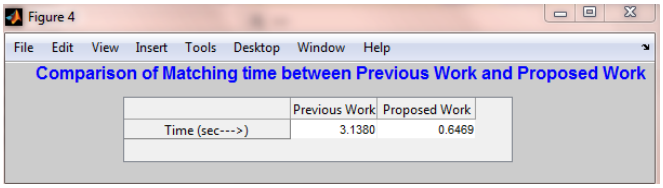


Figure 4, shows the graphical representation of the tabulated form of SSIM as given below:

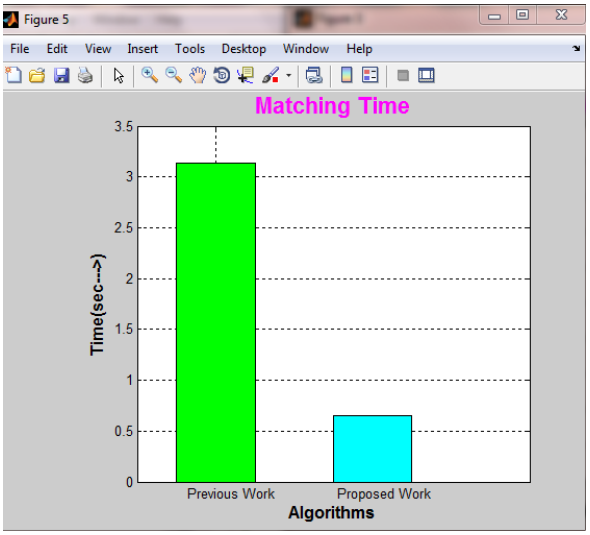


Figure 5 Comparison of matching time

Accuracy

Table 5, shows the accuracy of both algorithms on the basis of previous method and the proposed method. Our method shows the more accuracy as given below:

Table 5 Comparison of Accuracy

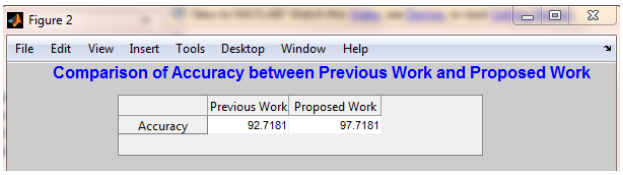


Figure 6, shows the comparison graph of accuracy of table 5 in form of accuracy. In this paper our proposed method – SURF, SVM and K-Means is better for accuracy.

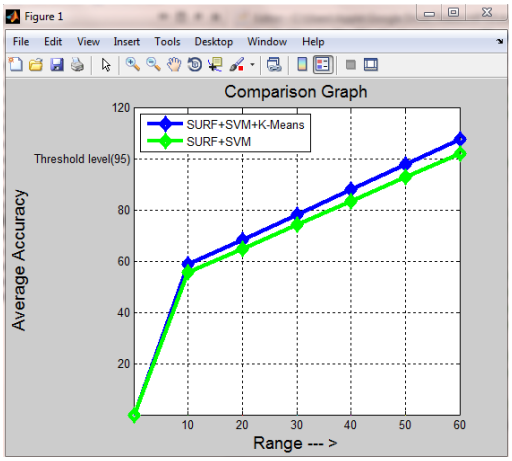


Figure 6 Comparison Graph of Previous Method and Proposed Method for Accuracy

Conclusion

In this paper, CBIR maintains a steady pace of development in the research field. Development promises an immense range of future applications using CBIR. The medical images for content based image retrieval are more suitable. Our proposed method is more suitable as compare to the previous method. In future, to improve the accuracy for the medical images in CBIR, take other classification techniques for the further work.

REFERENCES

[1]. Anna Wojnar et al., "Annotation of Medical Images Using the SURF Descriptor", ISBI, 130-133, 2012.

[2]. Wang Chuan-xu et al., "A New Method of Depth Measurement with Binocular Vision Based on SURF", Second International Workshop on Computer Science and Engineering, 2009.

[3]. Stevan Rudinac et al., "Comparison of CBIR Systems with Different Number of Feature Vector Components", IEEE, 2007.

[4]. Jingxin Hong et al., "Image Mosaic Based on SURF Feature Matching", International Conference on Information Science and Engineering (ICISE), 2009.

[5]. Jianlin Zhang et al., "Content-Based Image Retrieval Using Color and Edge Direction Features", IEEE, 2010.

[6]. Xu Chen et al., "A Novel Framework for Fast Scene Matching in Consumer Image Collections", ICME, 2010.

[7]. Yi Yang et al., "Recognizing Cartoon Image Gestures for Retrieval and Interactive Cartoon Clip Synthesis", IEEE Transactions On Circuits And Systems For Video Technology, Vol. 20, No. 12, December 2010.

[8]. K. Velmurugan et al., "Content-Based Image Retrieval using SURF and Colour Moments", Global Journal of Computer Science and Technology, May 2011.

[9]. Young Deok Chun et al., "Content-Based Image Retrieval Using Multi-resolution Color and Texture Features", 2008.

[10]. Md Mahmudur Rahman et al., "A Learning-Based Similarity Fusion and Filtering Approach for Biomedical Image Retrieval Using SVM Classification and Relevance Feedback ", July 2011.